

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-34 (Canceled).

Claim 35 (New): A method for analyzing at least one reaction medium comprising at least one cell C, the method comprising the following:

- (i) depositing the cell C onto a support S comprising a substantially planar surface, in the form of an aqueous drop on said surface;
- (ii) covering the substantially planar surface of the support S onto which the aqueous drop containing the cell C has been deposited with a separating film F that allows gases to pass through and prevents evaporation of the aqueous drops deposited onto the support S;
- (iv) preparing and introducing the reaction medium into the mass spectrometer;
- (v) desorbing and ionizing the reaction medium; and
- (vi) recording and analyzing the mass spectrum of the reaction medium.

Claim 36 (New): The method as claimed in claim 35, wherein, in a third step (iii), subjecting the cell C to a stimulation.

Claim 37 (New): The method as claimed in claim 36, wherein the stimulation to which the cell C is subjected is selected from the group consisting of:

- the introduction of a reagent R;
- being brought into contact with one or more cells;
- a supply of energy;

- the application of an electric field or of a magnetic field; and
- an optical treatment.

Claim 38 (New): The method as claimed in claim 35, wherein the attachment of the drops to the support S occurs due to surface tension forces.

Claim 39 (New): The method as claimed in claim 35, wherein the depositing of the aqueous drops containing a cell or a reagent onto the support S, and optionally under the separating film F, is carried out by means of fine capillaries.

Claim 40 (New): The method as claimed in claim 35, wherein the depositing of the aqueous drops containing a cell or a reagent onto the support S is carried out by means of a piezoelectric system.

Claim 41 (New): The method as claimed in claim 37, wherein the reagent R is selected from the group consisting of inorganic molecules, natural organic molecules, molecules derived from organic synthesis or from combinatorial synthesis, molecules extracted from biological samples, and molecules extracted from biological samples, which have been modified by synthesis.

Claim 42 (New): The method as claimed in claim 41, wherein the molecules are selected from the group consisting of single-stranded and double-stranded DNAs, single-stranded and double-stranded RNAs, and proteins and peptides.

Claim 43 (New): The method as claimed in claim 35, further comprising one or more steps consisting of treating the reaction medium directly on the support S before it is introduced into the mass spectrometer.

Claim 44 (New): The method as claimed in claim 43, further comprising at least one treatment step selected from the group consisting of cell lysis, one or more washes, and the adsorption or the attachment of molecules.

Claim 45 (New): The method as claimed in claim 35, further comprising at least one step consisting of treating the reaction medium or media placed on the support S with a solution of molecules that promote desorption.

Claim 46 (New): The method as claimed in claim 35, wherein the preparation, with a view to introduction into the mass spectrometer, comprises at least one step selected from the group consisting of freezing the reaction medium; drying with or without heat treatment and with or without a vacuum; and fixing by means of a treatment with an agent.

Claim 47 (New): The method as claimed in claim 46, wherein the agent comprises methanol or formaldehyde.

Claim 48 (New): The method as claimed in claim 35, wherein the preparation, with a view to introduction into the mass spectrometer, comprises the addition to the reaction medium of one or more acid molecules that are small in size and absorb light, followed by drying.

Claim 49 (New): The method as claimed in claim 48, further comprising at least the following steps:

- introduction of the reaction medium or media placed on the support S into a mass spectrometer tube;
- application of a vacuum and of an electric field in the spectrometer tube;
- application of a desorption/ionization treatment in a controlled and sequenced manner on the sample(s); and
- detection of the mass of the ions formed.

Claim 50 (New): The method as claimed in claim 35, further comprising at least one step consisting of comparing the data recorded with a mass spectrum bank.

Claim 51 (New): A device for analyzing at least one reaction medium comprising at least one cell C, the device comprising the following:

- a support S comprising a substantially planar surface, wherein the surface of the support S is covered with a separating film F that allows gases to pass through and prevents evaporation of the aqueous drops deposited onto the support S;
- means for depositing onto said surface aqueous drops containing the cell C;
- means for desorbing and ionizing the reaction medium; and
- a mass spectrometer.

Claim 52 (New): The device as claimed in claim 51, further comprising a controlled-atmosphere chamber in which the support S is placed so as to allow the survival of the cell C.

Claim 53 (New): The device as claimed in claim 52, wherein the controlled-atmosphere chamber is an incubator at a temperature ranging from 35 to 42°C, the CO₂ level is maintained at between 3 and 5%, and the oxygen O₂ level is that of ambient air.

Claim 54 (New): The device as claimed in claim 53, wherein the temperature ranges from 36.5 and 37.5°C.

Claim 55 (New): The device as claimed in claim 51, wherein the separating film F is selected from the group consisting of:

- a non-water-miscible liquid;
- a gas;
- a flexible, solid film; and
- a rigid honeycombed cover made of porous material, the size of the cavities being adjusted so as to be able to contain the drop of cell(s) and, optionally, a drop of reagent.

Claim 56 (New): The device as claimed in claim 51, wherein the support S consists of a plate that is made of silicon, glass, or a polymer.

Claim 57 (New): The device as claimed in claim 51, wherein the support S comprises an electrically conducting layer.

Claim 58 (New): The device as claimed in claim 51, wherein the support S has a substantially planar surface comprising at least one means for receiving the aqueous drops.

Claim 59 (New): The device as claimed in claim 58, wherein the means for receiving the aqueous drops consists of one of the following:

- the support S exhibits a hydrophobic nature on its planar surface and comprises one or more hydrophilic areas;
- the support S comprises cavities of a depth ranging from 1 micron to 1 millimeter on its planar surface;
- the support S is a plate equipped with outgrowth of small thickness, from 1 micron to 1 millimeter, arranged on its surface and intended to promote the attachment of the drops; and
- the support S is a plate equipped with at least one wire, onto which the drops attach.

Claim 60 (New): The device as claimed in claim 51, wherein the support S of the device is mobile.

Claim 61 (New): The device as claimed in claim 51, wherein the aqueous drops containing one or more cells comprise a culture medium.

Claim 62 (New): The device as claimed in claim 51, wherein the means are connected to a control device that allows it to be automated.

Claim 63 (New): The device as claimed in claim 51, wherein the support S comprises means for receiving the drops, arranged regularly in the form of a matrix.

Claim 64 (New): The device as claimed in claim 63, further comprising at least one piece of equipment for measuring the mass of a sample by means of mass spectrometry; the piece of equipment comprising a spectrometer tube, a device for creating a vacuum in the tube; electrical means for applying an electrical acceleration potential in the tube so as to accelerate the molecules of the sample to be analyzed; a means for detecting the mass of the ions formed; a means of introducing the support S into the tube; and a means for the desorption and the ionization of the sample to be treated.

Claim 65 (New): The device as claimed in claim 51, wherein the desorption means is selected from the group consisting of a laser beam; a beam of ions; a beam of neutral atoms; a beam of electrons; and the spraying of a liquid sample.

Claim 66 (New): The device as claimed in claim 51, wherein the desorption/ionization means is selected from the group consisting of:

- o MALDI: matrix assisted laser desorption ionization;
- o SELDI: surface enhanced laser desorption ionization;
- o SIMS: secondary ion mass spectrometry;
- o SLAMS: secondary neutral mass spectrometry;
- o ESI: electrospray ionization o FAB: fast atom bombardment; and
- o APCI: atmospheric pressure chemical ionization.

Claim 67 (New): The device as claimed in claim 51, wherein the means of measuring the mass is selected from the group consisting of:

- o TOF: time of flight;
- o MS/MS: tandem mass spectrometry or multidimensional mass spectrometry;

- o quadrupole (or ion trap); and
- o FT-MS or FT-ICR: Fourier-Transform mass spectrometry - ion cyclotron resonance.

Claim 68 (New): A method for identifying modifications that have been involved in a cell culture subsequent to a stimulation, comprising identifying modifications that have been involved in a cell culture subsequent to a stimulation with the device as claimed in claim 51.

Claim 69 (New): A method for studying a change over time of a response of a cell or of a set of cells to a stimulation, comprising studying the change over time of the response of a cell or of a set of cells to a stimulation with the device as claimed in claim 51.